



COMPLETIONS

Clearing A Path To Production

Fracturing technology simplifies retrieval of downhole hardware after fracturing, easing future wellbore re-entry

BY ANY MEASURE, THE DEVELOPMENT of open-hole fracturing for long-reach horizontal wells has been a blessing to the oil industry, allowing producers to tap hydrocarbon reservoirs previously considered exhausted, by using conventional stimulation methods.

When fracturing is complete, however, most of the technologies currently available leave the hardware—usually a liner and several ball-and-seat assemblies—solidly fixed in the wellbore, where it stays for the life of the well. Later, if an operator has to re-enter the wellbore to perform workovers, for example, the hardware can become an obstacle, since it limits the diameter of tools that can be used.

Still, industry has found ways to work around—or, more typically, through—the problem by going back into the well to mill or drill out the remaining ball-and-seat assemblies. While doing so represents an adequate “fix”

for the problem, it’s also an expense most well operators would rather avoid.

One company that’s tackling the problem squarely is Suretech Completions Canada Ltd., a unit of Sanjel Corporation that has developed a retrievable ball-and-seat technology. After fracturing is done, the well operator can use the SUREstack system to pull the ball-and-seat assemblies from the well in a single operation, clearing a path for later re-entry, should further downhole operations be needed.

According to Suretech engineering manager Darryl Firmaniuk, SUREstack’s biggest advantage is that it allows well operators to remove ball-and-seat assemblies without the need for milling or drilling, thereby avoiding the extra cost and time involved (milling can cost \$80,000 or more).

“At the end of the day, [the SUREstack system] gives you a full-bore opening so you can go in with remedial >

NO MORE MILLING

Suretech’s retrievable ball-and-seat multistage fracturing technology ensures a full-bore opening is maintained after fracturing, without the need to mill or drill out non-retrievable hardware.

equipment in the future, and you don't have to worry about any type of restrictions in the wellbore that you have to flow through to produce the well," he says.

In the current marketplace, there are fracturing systems in which "a lot of extra money is spent drilling out balls and seats, but very few companies have a retrievable seat system."

With traditional fracking systems, to get full production from the well, the operator needs to get rid of the balls and seats in the traditional frac sleeves, Firmaniuk says. However, for wells without much reservoir pressure, there's often not enough pressure to push the balls from their seats and back to surface in the drilling fluid, so they stay behind, obstructing production.

"If you don't flow [the balls] back to surface, the customer has to make a decision," he adds. "Does he want to go ahead and drill out the balls and seats? Typically, [to do so] we'd go in with coiled tubing, a mud motor and bit, and drill [them] out in the wellbore. That can be somewhat time-consuming, if it doesn't go according to plan."

Using SUREstack instead of milling, the well operator can go in with a retrieving tool, and start by securing the top seat in the uppermost frac sleeve. "You engage it, using tension to remove the ball and seat

from the chassis of the valve, then pull up and make sure you're free from the valve. Then you grab the next ball-and-seat [assembly] for the next valve, and repeat the process as you go down the wellbore," he says.

In effect, the whole retrieval process is done in a single operation without exiting the wellbore. On a technical point, Firmaniuk notes, not all of Suretech's customers want to return the balls and seats to surface. About half prefer a second option, which disposes of them in a sump area—still downhole—at the bottom of the liner.

Among Suretech customers who did prefer to remove all ball-and-seat assemblies from the well was a producer working in central Alberta's Pembina area, whose experience Suretech recently described in a case study. In that case, the producer wanted to regain use of the full wellbore's inner diameter after multistage fracturing. It required seven seats and one hydraulic port to fracture the well, drilled to 3,060 metres, with the deepest retrievable seat at 2,861 metres.

After completion of fracturing, Sanjel's coiled tubing was used to pull out all of the balls and seats at an average retrieval rate of two minutes per seat, according to Suretech. Compared to traditional drilling

and milling out, the operation effectively reduced the total time required to remove the seats by 90 per cent, Suretech said in its case study (results could not be independently verified).

On the market for about a year now, the SUREstack system was invented by a Canadian, Suretech founder Sean Campbell, whose company was later bought by Sanjel, and now operates as one of the latter's Canadian divisions.

Among Canadian companies specializing in fracking long-reach horizontals, few currently offer a fully retrievable ball-and-seat system like Suretech's. One alternative to retrieving the drop-balls commercialized by a competitor and under development by at least one other company involves a degradable ball system, in which the drop-balls used in fracturing later break down and dissolve in the drilling fluid and are pumped out of the system, avoiding the need to mill them out. The valves that control flow between zones can be reset for reuse later, say, in restimulating the well.

■ James Mahony

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